IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:	:	
Jeffrey A. Lee	:	Examiner: Steve Alvo
U.S. Serial No. 10/625,086	:	Group Art Unit: 1731
Filed: July 23, 2003	:	
Docket No. 2159-A (FJ-99-39A)	:	
For: METHOD OF BLEACHING AND PROVIDING PAPERMAKING FIBERS WITH DURABLE CURL	:	

Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

BRIEF ON APPEAL UNDER 37 CFR §41.37(c)

Sir:

Applicant hereby submits its *Brief on Appeal* in the above-noted United States Patent Application. A *Notice of Appeal* was submitted on September 30, 2004 appealing the rejection of Claims 13, and 64-82. Please charge the fee for the *Brief* to our Deposit Account No. 50-0935.

This *Brief* is being filed with a *Petition* and fee for a one-month *Extension of Time*. If additional extensions are required, please consider this paper a *Petition* therefore and charge our Deposit Account No. 50-0935.

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I. REAL PARTY IN INTEREST

Georgia-Pacific Corporation, 133 Peachtree Street, N.E., Atlanta, Georgia 30303, is the real party in interest in this patent application, assignee of record.

II. RELATED APPEALS AND INTERFERENCE

There are no related appeals, interferences or judicial proceedings related to, or which will affect, or which will be affected by, or which will have a bearing on the Board's decision in this appeal.

III. STATUS OF CLAIMS

Claims 13 and 64-82 are pending in this application and are on appeal. Claims 1-12 and 14-63 have been canceled. Claims 1-12 and 14-63 were allowed in the parent application to this case, now United States Patent No. 6,627,041. A complete listing of the *Claims on Appeal* is provided in Appendix A hereto.

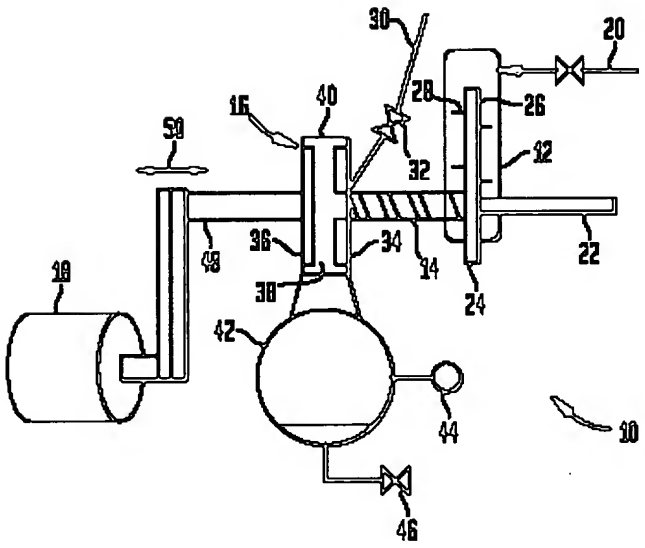
IV. STATUS OF AMENDMENTS

No amendments have been filed after the *Final Rejection* of July 1, 2004.

V. SUMMARY OF CLAIMED SUBJECT MATTER

Generally, the subject matter claimed in this case is absorbent sheet made by blending fiber which has been curled and heat treated in accordance with the invention with fiber which has not been subjected to that treatment; but which fiber is otherwise identical. The fiber treatment process *per se* was claimed in the parent application to this case, now United States Patent No. 6,627,041. The process of the '041 patent is a method of providing durable curl to a papermaking pulp including Kraft fiber by way of concurrently heat-treating and convolving the fiber in a curling/heat treatment process. The process may be carried out in a matter of seconds without damaging the fiber using a disk refiner provided with steam, for example, as is seen in **Figure 1** of this application. The pulp is fed to a refiner **40** and curled between a stator **34** and a rotor **36** in the presence of steam in a refining gap **38**.

FIG. 1



Two salient features of the process include short processing duration and lower power inputs as is described on pages 14-15 of the application as filed:

> Quite remarkably, the bleaching, heat treating and convolving of the fiber is carried out with very short residence times in a disk refiner, for example, involving a duration of from about 0.01 to about 20 seconds. Typically, the step of heat treating and convolving the fiber has a duration of less than about 10 seconds with less than about 5 seconds, and indeed, less than about 2 seconds being typically suitable.
>
> Heat treatment and curling of the fiber is generally carried out a temperature of from about 230°F to about 370°F and typically with relatively low power inputs. Mechanical power inputs of less than about 2 HP day/ton, more preferably less than about 1 HP day/ton, and even more preferably at mechanical energy inputs less than about 0.5 HP day/ton are suitable. Higher energy inputs may be suitable under some conditions. For example, provided the equipment is suitable and the fiber is not subject to undue degradation one may utilize more than about 5 HP day/ton up to about 10, 15, 20 or even 25 HP day/ton if the

material will not develop substantial paper strength and fiber bonding by way of such treatment.

The short treatment times and low power imparts make the invention an attractive alternative to more expensive high bulk additives such as chemically crosslinked fiber.

Perhaps more importantly for purposes of this appeal, the short processing times and remarkable properties of the fiber make the novel products of the invention including treated and untreated but otherwise identical fiber an attractive product option. That is not the case with prior art processes or products which generally require additional inventory, elaborate processing, expensive specialized equipment and so forth. Indeed, there is no suggestion in the prior art of the claimed subject matter, no doubt because of such difficulties. Conventional curled pulp additives are conventionally much different from the pulp with which they are combined.

For purpose of this appeal, the claims are divided into two groups, Group I includes Claims 13 and its Dependent Claims, 64-72; while Group II includes Claim 73 and its Dependent Claims, 74-82.

Claim 13 is representative of Group I:

13. (Currently Amended) An absorbent sheet formed by:

(a) bleaching cellulosic fiber and producing fiber with a durable elevated curl index by way of a process comprising:

(1) feeding a first cellulosic pulp including Kraft fiber to a refining gap defined between opposed surfaces, at least one of the surfaces being rotatable with respect to its opposed surface;

(2) concurrently heat-treating, bleaching and convolving the cellulosic fiber pulp including Kraft fiber in the refining gap at elevated temperature and pressure at high consistency in a bleaching liquor under conditions selected so as to preclude

substantial fibrillation and attendant paper strength and fiber bonding development;

(3) recovering said pulp wherein the length weighted curl index of the treated fiber is at least about 0.12;

(b) incorporating the Kraft fiber with the elevated curl index provided by way of steps (a)(1), (a)(2) and (a)(3) in the absorbent sheet; and

(c) incorporating a second cellulosic pulp into the sheet which has not been concurrently heat treated, bleached and convolved but which is otherwise identical to said first cellulosic pulp.

Claim 73 is representative of Group II:

73. (Currently Amended) An absorbent sheet incorporating secondary fiber which has been concurrently heat- treated and convolved wherein said secondary fiber has a curl index of at least about 0.12., the absorbent sheet also incorporating secondary fiber which has not been concurrently heat treated and convolved but which secondary fiber is otherwise identical to the secondary fiber which has been concurrently heat treated and convolved and incorporated into the sheet.

VA. ADDITIONAL EVIDENCE

Additional evidence of patentability, a declaration under 37 CFR 1.132 of *Jeffrey A. Lee*, was submitted with the response of April 6, 2004. That Declaration was acknowledged in the Office Action of July 1, 2004, page 3. A copy of the Declaration of *Jeffrey A. Lee* appears in Evidence Appendix B hereto.

VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

In the final rejection of July 1, 2004 all claims were rejected over art. There appears to be typographical errors in the claim numbers as to all rejections. For purposes of completeness, the three rejections made will be treated as if applicable to all claims. The rejections read substantially as follows with corrected claim numbers and reference numbers supplied in italics:

A. Claims 13 and *64-82* are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over WO 97/45483 with or without HU (6,413,362) or HU et al. (6,506,282).

B. Claims *13* and *64-82* are rejected under 35 U.S.C. 103(a) as being unpatentable over WO 97/45483 with or without HU (6,413,362) or HU *et al.* (6,506,282) as set forth above in the rejection of Claim 13, in view of KASSER et al., *(4,409,065).*

C. Claims *13* and *64-82* are rejected under 35 U.S.C. 103(a) as being unpatentable over WO 97/45483 with or without HU (6,413,362) or HU et al. (6,506,282) with or without KASSER as applied to Claim 13 above, further in view of DUNNING et al., *(4,166,001).*

Concise statements of issues on appeal are accordingly:

D. Whether or not the claimed subject matter of Claim Group I is patentable over the references cited in rejections A, B and C above;

E. Whether or not the claimed subject matter of Claim Group II is patentable over the references cited in rejections A, B and C above.

VII. ARGUMENT

The art cited in the above rejections does not disclose, teach or suggest the absorbent sheet claimed in this application which requires a first cellulosic pulp that is curled in accordance with the invention and a second pulp which has not been curled, but is otherwise identical. The invention makes it possible to adjust sheet properties by curling a pulp component in a matter of seconds without treating another, otherwise identical pulp component. There is no need for additional exotic equipment or inventory, nor is there a need for extensive processing times which can slow production and increase expense.

Moreover, the present invention makes it possible to adjust sheet properties using identical fiber. Consider **Table 9** of the application as filed, wherein it is seen that tensiles of sheet made from curled and uncurled recycle fiber from a common paper source (application as filed p. 38) can be changed up to 50% or so simply by using the same fiber curled by the inventive method. The control fiber and curled fiber is identical in all respects except for the concurrent curling/heat treatment.

Table 9. Base Sheet Results

		Example				
		36	37	38	39	40
% Refiner Bleached Fiber		0	20	40	60	100
Basis Weight	lb/3000ft^2	8.9	8.5	8.5	8.3	7.2
Caliper	In	33.7	34.0	34.6	36.5	34.9
Bulk	ft^3/lb	0.118	0.125	0.127	0.137	0.151
MD Tensile						
Max Load	g	679.737	529.313	462.691	470.589	308.430
% Disp	%	25.667	24.426	23.296	25.759	24.667
CD Tensile						
Max Load	g	424.431	340.157	308.716	274.995	230.614
% Disp	%	4.500	5.296	4.981	6.037	6.370
Headbox Mean Curl		0.081	0.104	0.101	0.115	0.120
Porofil		8.3	8.6	8.4	9.4	10.3

So also, absorbency (Porofil) is increased up to about 20 percent without changing fiber, simply by curling the fiber.

A. Claims 13 and 64-82, Claim Groups I and II are patentable over WO 97/45483 with or without HU '362 or HU et al. '282.

The claims were rejected on the basis of Example 1 of WO 97/45483. That rejection is in error because Example 1 of WO 97/45483 has no "uncurled" pulp as required by the claims and certainly does not have identical curled and uncurled fiber components as is also required by the claims. Indeed the combination of Example 1 of WO 97/45483 teaches away from the invention in that it teaches to use different fiber components to adjust properties:

> Example 1: (Heat-cured fibers).
>
> Southern pine softwood kraft pulp (CR-54) was fiberized in a Pallman fiberizer, preconditioned to a moisture content of 5% and then heated in a convection oven at 200°C. for 20 minutes crosslink and curl the fibers. (A catalyst can be used to reduce the temperature and length of the treatment.) After treatment, the fibers had a water retention value (WRV) of 0.65g/g and a curl index of 0.15 (measured via Fiber Quality Analyzer) versus a WRV of 1.2g/g and a curl index of 0.09 before treatment. This fiber was combined in a 50/50 blend with eucalyptus kraft fiber that had been treated at high consistency and elevated temperature in a disperser in accordance with US Patent No. 5,348,620 issued September 20, 1994 to Hermans et al. entitled "Method of Treating Papermaking Fibers for Making Tissues", which is herein incorporated by reference. More specifically, the eucalyptus fibers were dispersed in a Maule shaft disperser at a temperature of about 150°F. at a consistency of about 30 percent with a power input of about 1.5 horsepower per day per ton. The combined fiber furnish was then formed into handsheets and subjected to dewatering conditions designed to simulate the operation of a high intensity extended nip press.

Softwood Kraft pulp is a long fiber, often used for strength while eucalyptus fiber is a short hardwood fiber used for its softness. *See* Declaration of *Jeffrey A. Lee*, paragraph 10 and Table 5 attached, wherein it is seen that Example 30 (softwood) fiber lengths are much greater than hardwood fiber lengths (Example 31). Clearly the combined pulps in WO 97/45483 are not "otherwise identical".

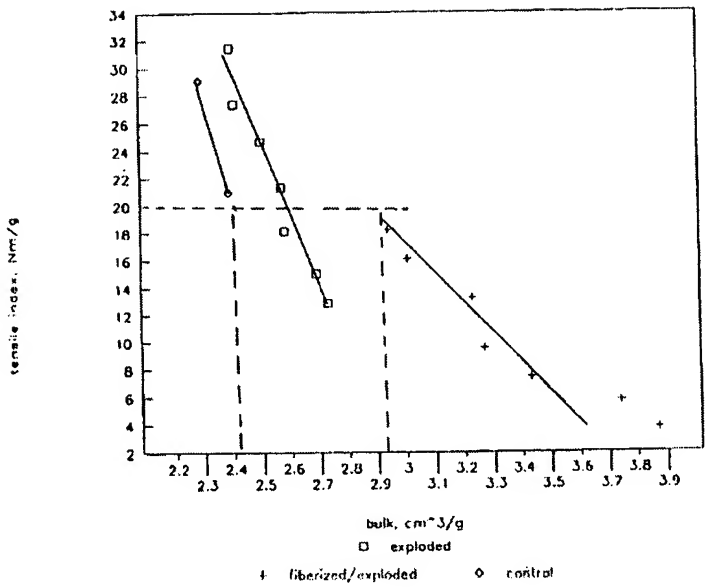
HU et al. '362 has fiber blends. See Tables 2, 3 of HU et al. of '362 wherein fiber which has been curled by steam explosion is blended with refined fiber. The fiber components are vastly different. The fiber which has been curled or exploded has a freeness of 700 or more, while the refined fiber has a freeness of 315. Note Table I:

TABLE 1

		Valley Beater Data LL-19						
MINUTES		0	3	5	15	30	45	60
C.S. FREENESS	(ml)	705	695	685	635	580	430	315
BURST INDEX	(kPam^2/g)	1.06	1.62	2.24	4.59	6.22	7.89	8.04
BULK	(cm^3/g)	2.30	2.29	2.15	1.99	1.84	1.81	1.68
SCOTT BOND	(ft.lb.)	0.022	0.030	0.038	0.150	0.225	0.388	>.500
TENSILE INDEX	(Nm/g)	20.97	29.04	36.45	65.14	80.46	97.82	102.09
STRETCH	(%)	1.76	2.24	2.46	3.61	4.07	4.65	4.64
T.E.A.	(J/m^2)	13.47	24.66	33.71	84.60	114.21	150.50	156.49
OPACITY, ISO	(%)	76.8	76.6	74.9	73.5	70.4	69.9	67.7
SCATTERING COEF.	(m^2/kg)	37.55	37.32	34.14	31.63	27.03	26.34	23.67
ABSORPTION COEF.	(sqm/kg)	0.24	0.24	0.24	0.26	0.28	0.28	0.29
POROSITY, Frazier	(cfm/ft^2)	80.5	54.4	43.5	16.0	6.5	2.0	1.5

Clearly the fiber components used in Hu et al. ' 362 are not identical except for the curl treatment as is recited in Claim Groups I and II. The refined fiber has been substantially refined and fibrillated, a structural feature excluded specifically by Claim 13, which is patentable for this reason as well.

Furthermore, the curled and exploded fiber is so weak it is unuseable with like fiber, teaching away from the invention. Note Figure 1 of Hu '362:



It is seen from the figure that the curled and exploded fiber has high bulk but essentially no strength requiring it to be used with highly refined fiber.

With regard to the Examiner's contention that Claim 9 of HU et al. '362 teaches the subject matter claimed, it is not specified or suggested in any way by Claim 9 that a curled fiber be blended with an uncurled, otherwise identical fiber:

> 9. The process of claim 1 wherein the fiber with a permanent fiber morphology is blended with a purified papermaking wood fiber at a ratio of about 1 part of the papermaking wood fiber per each 0.01 to 100 parts of the fiber with the permanent fiber morphology.

The teaching of Figure 1 and Tables 2 and 3 is decidedly to the contrary where highly refined fiber is combined with the exploded fiber.

Regarding Hu et al. '282, undersigned counsel finds no disclosure whatsoever of a sheet made from a fiber blend as is claimed in Groups I and II . Table I of the '282 patent is believed characteristic of this patent which shows sheet made only from exploded fiber or sheet made only from untreated fiber:

TABLE 1

	Bulk (cm³/gram)	Tensile Index (Nm/gram)	Brightness	Wet Curl Index
control	2.39	20.97	88.6	0.11
Steam-explosion treated	2.73	12.87	84.4	0.22

The Examiner's rejection of the claims based on WO 97/43483, Hu and HU et al disregards the basic teachings of the references—that conventionally a curled pulp additive is very different from the pulp with which it is combined. Disregarding the express teachings of references is contrary to MPEP §2141.03 because it is the epitome of hindsight:

> **PRIOR ART MUST BE CONSIDERED IN ITS ENTIRETY, INCLUDING DISCLOSURES THAT TEACH AWAY FROM THE CLAIMS**
>
> A prior art reference must be considered in its entirety, i.e., as a whole, including portions that would lead away from the claimed invention. *W.L. Gore & Associates, Inc. v. Garlock, Inc.* 721 F.2d 1540, 220 USPQ 303 (Fed. Cir. 1983), *cert. denied*, 469 U.S. 851 (1984) (Claims were directed to a process of producing a porous article by expanding shaped, unsintered, highly crystalline poly(tetrafluoroethylene (PTFE) by stretching said PTFE at a 10% per second rate to more than five times the original length. The prior art teachings with regard to unsintered PTFE indicated the material does not respond to conventional plastics processing, and the material should be stretched slowly. A reference teaching rapid stretching of conventional plastic polypropylene with reduced crystallinity combined with a reference teaching stretching unsintered PTFE would not suggest rapid stretching of highly crystalline PTFE, in light of the disclosures in the art that teach away from the invention, i.e., that the conventional polypropylene should have reduced crystallinity before stretching and that PTFE should be stretched slowly.).

So also, references cannot be modified *ad hoc* to arrive at a claimed invention; any motivation to modify a reference must come from the references themselves. In this regard, it was noted in the *Schenck* case, 218 USPQ 698 (CAFC 1983) that modifications unwarranted by the references themselves is improper:

> If "rigidly fixed base structure" be read as encompassing its plate, says Nortron, it is equally readable on certain elements of the Rouy '654 prior art patent. That argument, however, turns on a conjectural modification of the disclosure of the '654 patent. Modification unwarranted by the disclosure of a reference is improper. See In re Imperato, 486 F.2d 585, 587, 179 USPQ 730, 732 (CCPA 1973); In re Beigel, 292 F.2d 955, 130 USPQ 206 , (CCPA 1961). In its modification, Nortron labels the outer end portions of what Rouy calls "flexible connections" as "base plates" and adds numerical designations to them. There is no justification for that modification. Rouy did not regard or describe those end portions as base plates; nor did he describe them in any manner; nor did he disclose their dimension in the direction of his shaft axis. The Rouy '654 patent, disclosing a support structure with gaps and numerous other differences from the structure claimed in the '511 patent, has little if any relevance, as was apparently recognized by the examiner in the Patent and Trademark Office who cited the '654 patent, but did not apply it to the claims.

Schenck v. *Norton*, 218 USPQ 698, 702 (CAFC 1983). *See also In re Gordon et al.*, 221 USPQ 1125 (CAFC 1984).

In particular, the motivation to combine or modify references in the manner urged by the Examiner must appear in the references:

> In other words, the Board must explain the reasons one of ordinary skill in the art would have been motivated to select the references and to combine them to render the claimed invention obvious."); In re Fritch, 972 F.2d 1260, 1265, 23 USPQ2d 1780, 1783(Fed. Cir. 1992) (the examiner can satisfy the burden of showing obviousness of the combination "only by showing some objective teaching in the prior art or that knowledge generally available to one of ordinary skill in the art would lead that individual to combine the relevant teachings of the references").
> With respect to Lee's application, neither the examiner nor the Board adequately supported the selection and combination of the Nortrup and Thunderchopper references to render obvious that which Lee described. The examiner's conclusory statements that "the demonstration mode is just a programmable feature which can be used in many different device[s] for providing automatic introduction by adding the proper programming software" and that "another motivation would be that the automatic demonstration mode is user friendly and it functions as a tutorial"do not adequately address the issue of motivation to combine. This factual question of motivation is material to patentability, and could not be resolved on subjective belief and unknown authority. It is improper, in determining whether a person of ordinary skill would have been led to this combination of references, simply to "[use] that which the inventor taught against its teacher." W.L. Gore v. Garlock, Inc., 721 F.2d 1540, 1553, 220 USPQ 303, 312-13 (Fed. Cir. 1983). Thus the Board must not only assure that the requisite

> findings are made, based on evidence of record, but must also explain the reasoning by which the findings are deemed to support the agency's conclusion.
> Deferential judicial review under the Administrative Procedure Act does not relieve the agency of its obligation to develop an evidentiary basis for its findings. To the contrary, the Administrative Procedure Act reinforces this obligation. See, e.g., Motor Vehicle Manufacturers Ass'n v. State Farm Mutual Automobile Ins. Co., 463 U.S. 29, 43 (1983) ("the agency must examine the relevant data and articulate a satisfactory explanation for its action including a 'rational connection between the facts found and the choice made.'") (quoting Burlington Truck Lines v. United States, 371 U.S. 156, 168 (1962)); Securities & Exchange Comm'n v. Chenery Corp., 318 U.S. 80, 94 (1943) ("The orderly function of the process of review requires that the grounds upon which the administrative agency acted are clearly disclosed and adequately sustained.").

In re Lee, 61 USPQ2d 1430, 1434 (CAFC 2002).

In this case neither WO 97/43483 nor Hu nor Hu et al alone or in combination even suggest the claimed subject matter which is accordingly believed allowable. Likewise, rejections B and C noted above are insufficiently supported by the *Kasser et al.* and *Dunning et al.* references and should also be withdrawn.

B. Claims 13 and 64-82, Claim Groups I and II are patentable over WO 97/45483 with or without HU '362 or HU et al. '282 in further view of Kasser et al.

WO 97/45483, Hu and Hu et al. have been discussed above; these references are not meaningfully supplemented by the citation of Kasser at al. Claim 1 of Kasser et al., cited in rejection B, is reproduced below:

> What is claimed is:
> 1. In a method for the production of kraft paper comprising the steps of preparing the pulp in a conventional manner including beating or refining or treating the pulp in a Kollergang to produce a refined pulp,
> the improvement for producing kraft paper for heavy paper bags having increased tensile energy absorption and an elastic stretch exceeding 1.8%, comprising dewatering said refined pulp to a water content of substantially 20% to 60%, processing said dewatered pulp by separate curlation to curl the fibers to an average factor of curl exceeding 1.3, dispersing said curled pulp with water to a curled fiber content of approximately 0.09% to 0.21%, promptly forming a wet web from said pulp before the fibers restraighten, and drying the wet web while maintaining low tension so that the curl of the fiber is maintained.

As can be seen from the plain text of the Claim 1 of Kasser et al., there is no suggestion whatsoever of providing a sheet made from a blend of durably curled and otherwise identical uncurled fiber. Indeed, the sheet of Kasser et al. needs to be made immediately and dried under low tension or the benefit of the fiber curl is lost. In this regard, the reference is utterly opposite to the WO 97/43483 an HU and HU et al. which relate to fibers heat treated to make the curl durable and blended with other fibers for strength.

The combination of references proposed is accordingly improper, contrary to MPEP §2143.02, last heading:

> THE PROPOSED MODIFICATION CANNOT CHANGE THE PRINCIPLE OF OPERATION OF A REFERENCE
>
> If the proposed modification or combination of the prior art would change the principle of operation of the prior art invention being modified, then the teachings of the references are not sufficient to render the claims prima facie obvious. In re Ratti, 270 F.2d 810, 123 USPQ 349 (CCPA 1959) (Claims were directed to an oil seal comprising a bore engaging portion with outwardly biased resilient spring fingers inserted in a resilient sealing member. The primary reference relied upon in a rejection based on a combination of references disclosed an oil seal wherein the bore engaging portion was reinforced by a cylindrical sheet metal casing. Patentee taught the device required rigidity for operation, whereas the claimed invention required resiliency. The court reversed the rejection holding the "suggested combination of references would require a substantial reconstruction and redesign of the elements shown in [the primary reference] as well as a change in the basic principle under which the [primary reference] construction was designed to operate. 270 F.2d at 813, 123 USPQ at 352.).

Rejection B should accordingly be withdrawn, especially because the teaching of Kasser et al. is that it its process does not durably curl a fiber. Furthermore, Kasser et al. does not relate to absorbent sheet, it relates to paper bags, note the abstract:

> [57] **ABSTRACT**
>
> **Method for the production of kraft paper for increasing its functional quality, particularly its tensile energy absorption, whereby the pulp being prepared in a conventional manner is processed by additional separate curlation directly before web formation for increasing the elastic stretch and a paper bag made of that kraft paper wherein the elastic stretch exceeds 1.8%.**

Rejection (B) of the *Final Rejection* should be withdrawn for this reason as well.

C. Claims *13* and *64-82* are Patentable Over WO 97/45483 with or without HU (6,413,362) or HU et al. (6,506,282) with or without KASSER as applied to Claim 13 above, in further in of DUNNING et al., *(4,166,001).*

In the Final rejection, specifically, rejection C noted above, the Examiner further cited Example 1 of Dunning et al., reproduced below:

EXAMPLE I

The web example I was formed on a rolling slice forming section (see FIGS. 4, 5) at a speed of 1920 fpm. The furnish used consisted of 18.75% southern hardwood kraft, 18.75% northern softwood sulfite, 37.5% secondary fiber (consisting primarily of southern pine kraft and southern hardwood kraft) 25% broke and 0.25% Quaker 2001 chemical debonder. The wet sheet which was formed between a wire and a felt was subsequently pressed with a felt onto a creping dryer at a pressure of 80 pli. The web was then dried to approximately 5% moisture and creped off of the creping dryer. This example is meant to simulate a commercially producible debonded, lightly pressed creped tissue web of nominally 15 lb. dryer basis weight (DBW). The resulting creped tissue had the physical properties shown for the example 1 in the above table and was fairly dense and "papery", as would be expected from a product of this basis weight produced on a conventional creped wadding machine.

It is undisputed that of Dunning et al., teaches the use of secondary fiber in absorbent sheet; however, there is no teaching whatever to combine Dunning et al., with the other references in a manner which would render obvious the claimed subject matter in this case. The secondary fiber of Dunning et al. is clearly not durably curled. No motivation is seen in any references to make the combinations proposed in rejecting the claims; all of which are patentable.

D. Further Reasons for Allowance with respect to Claim Group I

Claims 13 and 64-72 contain the recitation that the fiber is bleached as part of the curling process before being made into absorbent sheet. This increases brightness and makes a more attractive product. This also increases curl and and makes a more absorbent product. Note Figures 6 and 7 of the application as filed; reproduced below:

FIG. 6

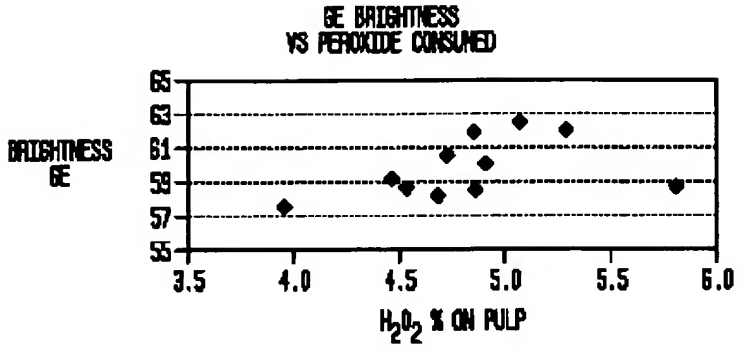
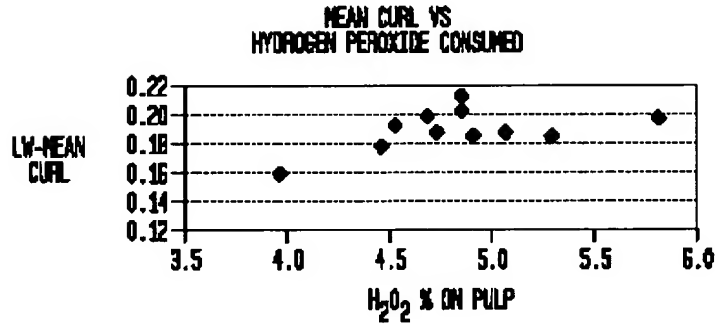


FIG. 7



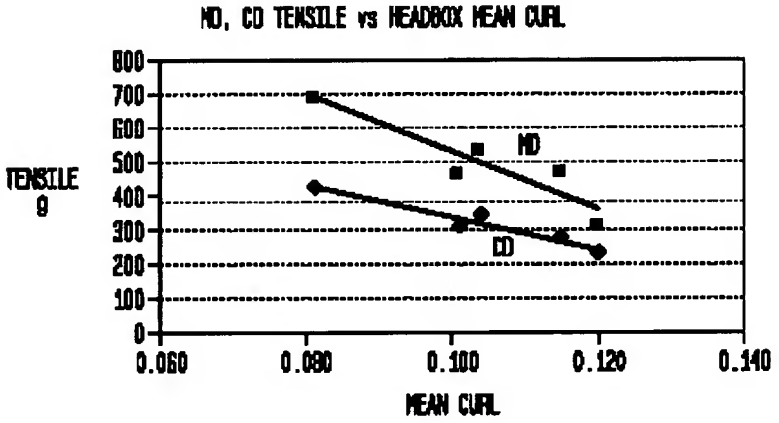
These highly desirable features are not remotely suggested in the references and are believed to render the Claims of Group I most clearly patentable; especially in view of Hu et al, '282 Table 1 (above, Section VIA, p. 11) which shows a decrease in brightness of more than 4 points when the fiber is "exploded".

E. Further Reasons for Allowance with Respect to Claim Group II

Claims 73-82 contain recitation of curled secondary fiber and otherwise identical uncurled secondary fiber. In Rejection A, the Examiner stated that the source of fiber made no difference. This is manifestly incorrect. Recycle fiber is less expensive and more environmentally friendly; however its use is limited because premium products frequently require higher quality virgin fiber. Of course one would utilize recycle fiber **exclusively** in towel and tissue products which are used once and then discarded, based on cost criteria alone, if the source of fiber made no difference. It does make a

difference, in part, because recycle fiber has low curl and tends to make absorbent sheet with high tensiles, which translate into low softness or high stiffness of a tissue product, for example. Consider Table 9 above as well as Figure 2 of the application as filed:

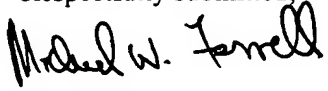
FIG. 2



A typical uncurled secondary fiber may have a mean curl of .08 or less, while corresponding virgin fiber may have untreated curl values of .09-.1 and more; see Base Example, Table 4 p.32 application as filed as well as comparative examples G and H, Table 5 and paragraph 11 of the attached *Declaration of Jeffrey A. Lee.* By way of the invention as Claimed in Group II, products incorporate secondary fiber with durable curl equivalent to and better than virgin fiber. That is a product attribute reflected in lower tensile of the sheet and .for example, softer tissue. A product attribute which is clearly patentable.

All claims should be allowed.

Respectfully submitted,



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APPENDIX A
CLAIMS ON APPEAL

13. An absorbent sheet formed by:

(a) bleaching cellulosic fiber and producing fiber with a durable elevated curl index by way of a process comprising:

(1) feeding a first cellulosic pulp including Kraft fiber to a refining gap defined between opposed surfaces, at least one of the surfaces being rotatable with respect to its opposed surface;

(2) concurrently heat-treating, bleaching and convolving the cellulosic fiber pulp including Kraft fiber in the refining gap at elevated temperature and pressure at high consistency in a bleaching liquor under conditions selected so as to preclude substantial fibrillation and attendant paper strength and fiber bonding development;

(3) recovering said pulp wherein the length weighted curl index of the treated fiber is at least about 0.12;

(b) incorporating the Kraft fiber with the elevated curl index provided by way of steps (a)(1), (a)(2) and (a)(3) in the absorbent sheet; and

(c) incorporating a second cellulosic pulp into the sheet which has not been concurrently heat treated, bleached and convolved but which is otherwise identical to said first cellulosic pulp.

64. The absorbent sheet according to Claim 13, wherein said step of heat-treating and convolving said fiber has a duration of from about 0.01 to about 20 seconds.

65. The absorbent sheet according to Claim 13, wherein said step of heat-treating and convolving said fiber has a duration of less than about 10 seconds.

66. The absorbent sheet according to Claim 13, wherein said step of heat-treating and convolving said fiber has a duration of less than about 5 seconds.

67. The absorbent sheet according to Claim 13, wherein said step of heat-treating and convolving said fiber has a duration of less than about 2 seconds.

68. The absorbent sheet according to Claim 13, wherein said step of heat-treating and convolving said fiber is carried out at a temperature of from about 230°F to about 370°F.

69. The absorbent sheet according to Claim 13, wherein mechanical energy input to said fiber during said heat-treating and convolving step is less than about 2 HP day/ton.

70. The absorbent sheet according to Claim 13, wherein said fiber comprises secondary fiber.

71. The absorbent sheet according to Claim 13, wherein said fiber consists essentially of secondary fiber.

72. The absorbent sheet according to Claim 13, wherein said fiber consists of secondary fiber.

73. An absorbent sheet incorporating secondary fiber which has been concurrently heat- treated and convolved wherein said secondary fiber has a curl index of at least about 0.12, the absorbent sheet also incorporating secondary fiber which has not been concurrently heat treated and convolved but which secondary fiber is otherwise identical to the secondary fiber which has been concurrently heat treated and convolved and incorporated into the sheet.

74. The absorbent sheet according to Claim 73, wherein said step of heat-treating and convolving said secondary fiber has a duration of from about 0.01 to about 20 seconds.

75. The absorbent sheet according to Claim 73, wherein said step of heat-treating and convolving said secondary fiber has a duration of less than about 10 seconds.

76. The absorbent sheet according to Claim 73, wherein said step of heat-treating and convolving said secondary fiber has a duration of less than about 5 seconds.

77. The absorbent sheet according to Claim 73, wherein said step of heat-treating and convolving said secondary fiber has a duration of less than about 2 seconds.

78. The absorbent sheet according to Claim 73, wherein said step of heat-treating and convolving said secondary fiber is carried out at a temperature of from about 230°F to about 370°F.

79. The absorbent sheet according to Claim 73, wherein mechanical energy input to said secondary fiber during said heat-treating and convolving step is less than about 2 HP day/ton.

80. The absorbent sheet according to Claim 73, wherein said sheet has a porofil value of at least 8.6.

81. The absorbent sheet according to Claim 80, wherein said sheet has a porofil value of at least 9.4.

82. The absorbent sheet according to Claim 80, wherein said sheet has a porofil value of at least 10.3

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:	:	
Jeffrey A. Lee	:	Group Art Unit: 1731
U.S. Serial No.: 09/793,874	:	Examiner: M.S. Alvo
Filing Date: February 27, 2001	:	
Docket No. 2159 (FJ-99-39)	:	
For: METHOD OF BLEACHING AND PROVIDING PAPERMAKING FIBERS WITH DURABLE CURL	:	
	:	

Assistant Commissioner for Patents
Washington, D.C. 20231

DECLARATION UNDER 37 CFR 1.132

Jeffrey A. Lee, inventor of the subject matter of the above-noted patent application hereby declares that:

1. He was awarded a Bachelor of Science degree from the University of Wisconsin in Green Bay, Wisconsin and has worked in the field of paper manufacture since 1989. That he believes himself the sole inventor of the subject matter of the above-noted patent application, which is generally directed to a method of curling and bleaching fiber.

2. That he has read the Official Action of January 31, 2002 rejecting Claims 1-63 as well as the references referred to in making those rejections and that he is familiar

with United States Patent No. 5,772,845 to *Farrington et al.* and United States Patent No. 5,501,768 to *Hermans et al.*

3. That he makes this *Declaration* on personal knowledge of the facts stated herein.

4. That mechanical pulps, or other high yield pulps are generally high lignin content pulps as noted in the '845 *Farrington et al.* patent at Cols. 5 and 6:

> Interestingly, it is believed that the degree and permanency of the curl is greatly impacted by the amount of lignin in the fibers being subjected to the disperging process, with greater effects being attainable for fibers having higher lignin content. Hence high yield pulps having a high lignin content are particularly advantageous in that fibers previously considered not suitably soft can be transformed into suitably soft fibers. Such high yield pulps, listed in decreasing order of lignin content, are groundwood, thermomechanical pulp (TMP), chemimechanical pulp (CMP), and bleached chemithermomechanical pulp (BCTMP). These pulps have lignin contents of about 15 percent or greater, whereas chemical pulps (kraft and sulfite) are low yield pulps having a lignin content of about 5 percent or less.

5. That the above passage of the *Farrington et al.* '845 patent notes that lignin-rich fibers are preferred in the curling process described in the '845 patent (which does not relate to bleaching). This observation is consistent with Untied States Patent No. 4,431,479 to *Barbe et al.* where claims are directed to a process for heat-setting curled high yield or lignin-rich fiber. The following passage (Col. 5, line 44 and following) is representative of the process of the '479 *Barbe et al. patent*:

> Among the advantages of the method of aspects of this invention in setting in fibre curl in high-yield pulps and mechanical pulps is to provide a means of controlling pulp properties in order to impart high wet-web stretch, work-to-rupture and increased drainage rates. In the case of high-yield pulps, in addition to the above wet-web properties, higher dry-sheet tear strength and stretch are also obtained.

> Thus, by this invention, it has been discovered that when lignocellulosic pulp fibres, that have already been made curly, are heat treated at (a) consistencies from 10% to 35%, (b) temperatures from 100°C. to 170°C. using steam at corresponding pressures of 5 psig to 105 psig, (c) for a period of time of from 2 minutes to 60 minutes, fibre curl permanently sets in place, and the curl is made resistant to removal in subsequent mechanical action experienced by fibres in the papermaking process. The method of aspects of this invention improves drainage, wet-web stretch, wet-web work-to-rupture and dry-sheet tear strength and stretch.

6. That United States Patent No. 5,501,768 to *Hermans et al.* teaches that a disk refiner is not a preferred method of imparting curl to fiber, as is noted at Col. 3, line 54 and following:

> In working the fibers within the disperser, such as by shearing and compression, it is necessary that the fibers experience substantial fiber-to-fiber contact by rubbing or shearing in addition to rubbing or shearing contact with the surfaces of the mechanical devices used to treat the fibers. Some compression, which means pressing the fibers into themselves, is also desirable to enhance or magnify the effect of the rubbing or shearing of the fibers. The desired fiber-to-fiber contact can in part be characterized by apparatus having a relatively high volume-to-working surface area ratio which increases the likelihood of fiber-to-fiber contact. The working surface for purposes herein is defined as that surface of the apparatus which contacts the majority of the fibers passing through. For example, disc refiners have a very low volume-to-working surface area (approximately 0.05 centimeters) because there is relatively small volume or space between the opposed rotating discs (working surfaces). Such devices work the fibers primarily by contact between the working surfaces and the fibres. However, the apparatus particularly useful for purposes of this invention, such as the various types of shaft dispersers, have a much higher volume-to-working surface area. Such volume-to-working surface area ratios can be about 1 centimeter or greater, preferably about 3 centimeters or greater, and more specifically from about 5 to about 10 centimeters. These ratios are orders of magnitude greater than those of disc refiners.

7. That, contrary the above teachings of *Barbe et al.*, *Farrington et al.* and *Hermans et al.*, it was unexpectedly discovered that low-lignin content fiber such as recycle or Kraft fiber could be provided with a very durable curl during bleaching in a disk refiner at short residence times and low power inputs. The Examples of the invention of the above-noted patent application illustrate these features of the process of the invention.

8. That Examples 1-8 and 9-25 of the above-noted application utilized secondary or recycle pulp. The pulp of Examples 1-8 was a lower brightness pulp containing a mix of chemical pulps, some amount of unbleached chemical (Kraft) pulp, and probably some amount of groundwood, or lignin containing fibers. Pulp of Examples 9-25 was higher brightness pulp which likely had a lower lignin content (less groundwood contamination) than that of Examples 1-8. That based on his experience, he would estimate that the Examples 1-8 pulp likely contained 10-15% groundwood fiber while the pulp used in Examples 9-25 had perhaps 5-10% groundwood fiber versus the 100% groundwood fiber in a pure mechanical pulp. These secondary pulps were amendable to curling by the process of the invention as is seen Tables 2 and 4, where 100% increases in curl index are typical. One possible conclusion here is that some level of groundwood contamination does not interfere with the curling/bleaching process of the invention. It is seen from Examples 26-31 that the higher lignin pulps did not curl well.

9. That Examples 26-29 of the above-noted patent application employed Western Aspen (Millar Western Aspen APP/BCTMP) which is aspen derived alkaline peroxide pulp/bleached chemithermal mechanical pulp, a high lignin, hardwood pulp. This pulp contains more than about 15% lignin; however, did not curl as well as other fibers curled in accordance with the present invention. It can be seen from Table 5 of the application as filed (attached hereto), first few rows, on average the fiber did not curl nearly as much as the low-lignin fiber in Tables 2 and 4. For example, the

"Base" or untreated fiber had a length weighted curl index of about 0.044 and the average curl for the seven samples is less than 0.06 or less than a 50% increase in curl.

10. That Examples 30 and 31 of the above-noted patent application utilized softwood and hardwood alkaline peroxide mechanical pulp (APMP), respectively. That these pulps are likewise high lignin pulps, having a lignin content of more than 15%. The control (untreated) softwood APMP fiber exhibited a curl index of 0.157, whereas Example 30 exhibited a lesser curl index value showing a decrease in curl. Likewise, the hardwood APMP of Example 31 showed a decrease in curl over the control.

11. That Examples 32-35 of the above-noted patent application utilized low-lignin Kraft hardwood and softwood fibers. These fibers have a lignin content of less than 5%. It can be seen in Table 5, second to last column that, here again, the treated fibers exhibited a curl index increase of 100% and more over control Examples G and H, which were the respective untreated pulps. This percent increase was consistent with that observed in connection with the recycle fiber of Examples 1-8 and 9-25.

12. That, based on the disclosure of the prior art discussed above, the results of Tables 2, 4 and 5 are unexpected and that lignin content is not required for the process of the present invention to be effective in providing a durable curl to papermaking fiber. The results of the present invention are also contrary to the teachings of the *Hermans et al.* patent discussed above which indicates that a disk refiner is not an effective curling apparatus. It was discovered that at elevated temperatures and pressures, a disk refiner can be a very effective apparatus for curling fiber.

13. The undersigned Declarant declares further that all statements made herein of his own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge

that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the subject application or any patent issuing thereon.

Dated April 29, 2002

J A Lee

Jeffrey A. Lee

Table 5. Examples 26-35 Pulp Fiber Analysis Data

		Percent Fines		Mean Length mm			Mean Curl		
Example	Ret	Arithmetic	Length Weighted	Arithmetic	Length Weighted	Weight Weighted	Arithmetic	Length Weighted	Kink Index
Base		39.4	10.74	0.422	0.694	0.893	0.042	0.044	0.76
26	0	41.88	12.39	0.395	0.648	0.827	0.076	0.079	1.17
26	12	42.7	12.56	0.39	0.66	0.88	0.073	0.078	1.14
27	0	39.8	11.08	0.417	0.683	0.866	0.038	0.039	0.55
27	12	39.8	10.74	0.421	0.688	0.861	0.038	0.039	0.53
28	0	39.52	10.46	0.439	0.722	0.925	0.035	0.036	0.5
28	12	41.17	11.26	0.418	0.693	0.875	0.037	0.037	0.52
29	0	45.15	14.53	0.36	0.617	0.837	0.082	0.084	1.31
F		52.27	9.36	0.6	1.751	2.633	0.122	0.157	1.33
30	0	54.09	9.28	0.623	1.913	2.86	0.089	0.103	1.03
30	72	53.83	8.89	0.651	2	2.915	0.077	0.094	0.98
F		55.9	16.24	0.377	0.794	1.087	0.109	0.121	1.67
31	0	55.08	15.46	0.385	0.817	1.152	0.083	0.089	1.48
31	72	55.27	16.05	0.373	0.786	1.087	0.065	0.071	1.17
G		56.42	7.33	0.798	2.399	3.238	0.087	0.097	1.27
32	0	58.12	8.46	0.717	2.293	3.18	0.197	0.211	2.4
32	72	51.04	6.2	0.859	2.395	3.216	0.19	0.209	2.33
33	0	55.92	7.59	0.749	2.283	3.134	0.192	0.202	2.42
33	72	53.65	7.12	0.78	2.259	3.056	0.192	0.209	2.31
33	3	55.77	7.98	0.748	2.304	3.228	0.213	0.233	2.42
33	3	56.16	7.68	0.744	2.319	3.198	0.201	0.215	2.42
33	72	55.4	7.92	0.738	2.238	3.089	0.205	0.225	2.32
33	72	54.4	7.42	0.772	2.265	3.114	0.199	0.214	2.32
H		63.73	16.29	0.379	0.935	1.32	0.082	0.091	1.4
34	0	61.73	17.16	0.365	0.835	1.131	0.159	0.169	2.21
34	12	60.12	15.82	0.383	0.873	1.172	0.145	0.154	2.15
35	0	57.65	14.5	0.408	0.893	1.195	0.141	0.153	2.07
35	12	59.73	15.34	0.398	0.892	1.181	0.127	0.139	1.99